

Appl. No. : 09/836,674
Filed : April 16, 2001

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for growing a thin film on a surface of a substrate in a reaction chamber having a single substrate according to the ALD method, said method comprising:

feeding a pulse of a first vapor phase reactant exclusively into said reaction chamber;
reacting the first vapor phase reactant with said surface of said single substrate to form a thin film on said substrate, wherein residual first vapor phase reactant remains in said reaction chamber;
and

feeding a pulse of a second vapor phase reactant exclusively into said reaction chamber, wherein said second vapor phase reactant reacts with said residual first vapor phase reactant to form a solid reaction product in said reaction chamber.

2. (Original) The method of Claim 1, wherein said residual first vapor phase reactant is in the gas phase.

3. (Original) The method of Claim 1, wherein said residual first vapor phase reactant is absorbed on the walls of the reaction chamber.

4. (Original) The method of Claim 1, wherein said reaction chamber comprises a pre-reaction chamber and a second reaction chamber, wherein said pre-reaction chamber is upstream of said second reaction chamber.

5. (Original) The method of Claim 4, wherein said second reaction chamber is operated under conditions conducive to ALD.

6. (Original) The method of Claim 4, wherein said thin film is formed in said second reaction chamber.

7. (Original) The method of Claim 4, wherein said residual first vapor phase reactant is present in said pre-reaction chamber.

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8. (Original) The method of Claim 4, wherein said reaction product is formed in said pre-reaction chamber.

9. (Original) The method of Claim 1, further comprising repeatedly alternately feeding at least said first vapor phase reactant and said second vapor phase reactant.

10. (Original) The method of Claim 9, further comprising contacting said first vapor phase reactant with residual second vapor phase reactant, thereby forming said reaction product.

11. (Original) The method of Claim 1, further comprising feeding a plurality of vapor phase reactants into said reactor.

12. (Original) The method of Claim 1, wherein said second vapor phase reactant reacts with said residual first vapor phase reactant under conditions conducive to chemical vapor deposition.

13. (Original) The method of Claim 4, wherein said pre-reactor is placed immediately adjacent to the said second reaction chamber and it is adapted to be freely communicating with the second reaction chamber.

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14. (Original) The method of Claim 4, wherein said first vapor phase reactant is fed into said reaction chamber from a source of first vapor phase reactant through a first feed channel and said second vapor phase reactant is fed into said reaction chamber from a source of second vapor phase reactant through a second feed channel.

15. (Original) The method of Claim 14, wherein said first feed channel and said second feed channel are interconnected upstream of said second reactor to form a gas space defining said pre-reactor.

16. (Original) The method of Claim 4, wherein said pre-reactor is operated under conditions conducive to chemical vapor deposition so as to form said solid reaction product.

17. (Original) The method of Claim 4, wherein said second vapor phase reactant is reacted with the residual first vapor phase reactant to form a solid product so as to deplete the residual first vapor phase reactant, thereby preventing said residual first vapor phase reactant from entering said second reaction chamber.

18. (Original) The method of Claim 4, wherein the pre-reactor is operated at the same temperature as the second reactor.

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19. (Original) The method of Claim 1, wherein the reaction product is removed from the reaction chamber separately from the thin film.

20. (Currently amended) A method for growing a thin film on a surface of a substrate in a reaction chamber according to the ALD method, said method comprising:

feeding a pulse of a first vapor phase reactant into said reaction chamber;
reacting the first vapor phase reactant with said surface of said substrate to form a thin film
on said substrate, wherein residual first vapor phase reactant remains in said reaction chamber; and
feeding a pulse of a second vapor phase reactant into said reaction chamber,
wherein said second vapor phase reactant reacts with said residual first vapor phase reactant
to form a solid reaction product in said reaction chamber; and

The method of Claim 1, wherein the reaction product is deposited on a discardable substrate.

21. (Original) The method of Claim 4, wherein the reaction product is formed on the inner walls of the pre-reactor, and the reaction product is removed from the pre-reactor by cleaning the walls.

22. (Original) The method of Claim 4, wherein a concentration of said residual first vapor phase reactant in said pre-reactor is reduced to less than 1 ppm by reacting said residual first vapor phase reactant with said second vapor phase reactant.

23. (Original) The method of Claim 4, wherein a concentration of said residual first vapor phase reactant in said pre-reactor is reduced to a concentration of less than 1 vol-% by reacting said residual first vapor phase reactant with said second vapor phase reactant.

24. (Original) The method of Claim 1, further comprising feeding an inactive gas into said reactor after feeding said first vapor phase reactant or said second vapor phase reactant.

25. (Original) The method of Claim 24, further comprising evacuating said reaction chamber while feeding said inactive gas.

26. (Original) The method of Claim 1, wherein a pressure in said reaction chamber is in the range of 1 to 100 mbar.

27-34. (Withdrawn)

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35. (New) The method of Claim 1, wherein unreacted reactants from the pulse of the first vapor phase reactant and the pulse of the second vapor phase reactant are sequentially fed into a second reaction chamber having a having a second single substrate.

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